CLAIMS

1. A stent, in particular a peripheral stent, for expansion from a first condition in which it can be introduced into a vessel (8; 8‴) into a second condition in which it holds the vessel (8; 8‴) in an expanded state, comprising a number of annular support portions (2, 2.1, 2.2) comprising bar elements (3; 3′; 3″; 3‴) which are connected in the longitudinal direction of the stent (1; 1′; 1‴ 1‴) by way of connecting bars (4; 4′), characterized in that it is so designed that it is displaceable with respect to a sheathing (8, 9; 8′″; 9‴) bearing at least in a portion-wise manner thereagainst in a first direction (5; 5′; 5‴ 5‴) without hooking engagement on the sheathing (8, 9; 8‴; 9‴).

2. A stent as set forth in claim 1 characterized in that in a condition of being expanded at least in a portion-wise manner it is displaceable with respect to a sheathing (8, 9; 8‴; 9‴) surrounding it at least in a portion-wise manner in a first direction (5; 5′; 5″; 5‴) without hooking engagement on the sheathing (8, 9; 8‴; 9‴).

3. A stent as set forth in claim 1 or claim 2 characterized in that the bar elements (3; 3′; 3‴) and the connecting bars (4; 4′) are of such a configuration and arrangement that the stent (1; 1′; 1″) is displaceable with respect to the sheathing (8, 9; 8‴; 9‴) bearing at least in a portion-wise manner thereagainst in a first direction (5; 5′; 5‴ 5‴) without hooking engagement on the sheathing (8, 9; 8‴; 9‴).

4. A stent as set forth in one of the preceding claims characterized in that the connecting bars (4; 4′) between a first annular support portion (2.1) and a second annular support portion (2.2) which is in adjacent relationship in the direction of displacement (5; 5′) engage in the region of the portions, projecting in the first direction (5; 5′), of the bar elements (3; 3′) of the first annular support portion (2.1), for preventing hooking engagement between the stent (1; 1′) and the sheathing (8, 9) upon displacement of the stent (1; 1′).

5. A stent as set forth in one of the preceding claims characterized in that at least a first annular support portion (2.1) and a second annular support portion (2.2) in adjacent relationship in the first direction (5; 5') are each formed by a respective bar element (3; 3') extending in a meander configuration in the peripheral direction of the stent (1; 1') and the connecting bars (4; 4') between the first annular support portion (2.1) and the second annular support portion (2.2) engage in the region of the turning points, adjoining the second support portion (2.2), of the bar element (3; 3') of the first support portion (2.1).

6. A stent as set forth in one of claims 3 through 5 characterized in that the respective connecting bar (4; 4') respectively engages the point, which projects furthest in the first direction (5; 5'), of the bar element (3; 3') of the first annular support portion (2.1).

7. A stent as set forth in one of claims 3 through 6 characterized in that the connecting bars (4; 4') engage the central region of the second annular support portion (2.2) with respect to the longitudinal direction of the stent (1; 1').

8. A stent as set forth in claim 7 characterized in that at least the second annular support portion (2.2) is formed by a bar element (3; 3') which extends a meander configuration in the peripheral direction of the stent and the connecting bars (4; 4') engage in the central region of the bar element (3; 3') of the second support portion (2.2) between the turning points (3.1; 3.1') of the bar element (3; 3') of the second support portion (2.2), with respect to the longitudinal direction of the stent (1; 1').

9. A stent as set forth in one of the preceding claims characterized in that the connecting bars (4; 4') are of a sufficient length which ensures flexibility of the stent (1; 1') with respect to its longitudinal direction.

10. A stent as set forth in one of the preceding claims characterized in that the connecting bars (4; 4') are designed and arranged to avoid twisting of the stent (1; 1') over its length.

11. A stent as set forth in claim 10 characterized in that the connecting bars (4; 4') are arranged in the longitudinal direction of the stent (1; 1') individually or in a portion-wise manner on alternate sides with respect to lines extending along the longitudinal direction of the stent (1; 1'), in such a way that a change in angle is imparted in opposite directions individually or in portion-wise manner at least to their points of engagement, which are in the first direction (5; 5'), on the bar elements (3; 3'), upon expansion of the stent (1; 1'), in the tangential plane of the peripheral surface of the stent.

12. A stent as set forth in one of the preceding claims characterized in that it is adapted for self-induced expansion from the first condition in which it can be introduced enclosed by a sheathing device (9; 9‴) into a vessel (8; 8‴) into the second condition in which it holds the vessel (8; 8‴) expanded, as a result of removal of the sheathing device (9; 9‴) from the stent (1; 1'; 1"; 1‴), which removal occurs in the first direction (5; 5'; 5"; 5‴) with respect to the stent (1; 1'; 1"; 1‴), and it has a number of annular support portions (2, 2.1, 2.2) comprising bar elements (3; 3'; 3"; 2‴) which are connected in the longitudinal direction of the stent (1; 1'; 1"; 1‴) by way of connecting bars (4; 4'), wherein it is so designed that when the sheathing device (9; 9‴) is not yet completely removed the stent can be restored to its first condition again by producing a relative movement of the sheathing device (9; 9‴) with respect to the stent (1; 1'; 1"; 1‴) in a second direction (14) in opposite relationship to the first direction (5; 5'; 5"; 5‴) without hooking engagement on the sheathing device (9; 9‴).

13. A stent as set forth in claim 12 characterized in that the bar elements (3; 3'; 3") and the connecting bars (4; 4') are of such a configuration and arrangement that when the sheathing device (9) is not yet completely removed the stent (1; 1'; 1) can be restored to its first condition again by

producing a relative movement of the sheathing device (9) with respect to the stent (1; 1'; 1) in a second direction (14) in opposite relationship to the first direction (5; 5'; 5) without hooking engagement on the sheathing device (9).

14. A stent as set forth in claim 12 or claim 13 characterized in that the connecting bars (4; 4') between a first annular support portion (2.1) and a second annular support portion (2.2) in adjacent relationship in the first direction (5; 5') engage in the region of the portions, which project in the first direction (5; 5'), of the bar elements (3; 3') of the first annular support portion (2.1) to prevent hooking engagement between the stent (1; 1') and the sheathing device (9) when the stent (1; 1') is restored to its first condition.

15. A stent as set forth in one of claims 12 through 14 characterized in that the stent material includes a shape memory alloy, in particular a nickel-titanium alloy.

16. A stent as set forth in claim 15 characterized in that at body temperature the stent material is in a stress-induced martensitic state in the first condition of the stent and in an austenitic state in the second condition of the stent.

17. A stent as set forth in claim 15 or claim 16 characterized in that the geometry of the bar elements (3; 3'; 3"; 3"') is so selected and/or the width of the bar elements (3; 3'; 3"; 3"') varies over the length thereof in such a way that the stresses which occur in the bar elements (3; 3'; 3"; 3"') when the stent material makes the transition in the first condition of the stent from the martensitic state into a stress-induced martensitic state as a result of an increase in temperature are below the respective plastic deformation limit of the stent material.

18. A stent as set forth in claim 17 characterized in that at least one annular support portion is formed by a bar element which extends in a meander

configuration in the peripheral direction of the stent (1″) and whose width decreases towards the center (16) between two turning points (3.1″).

19. A stent as set forth in one of claims 15 through 18 characterized in that at least one annular support portion (2, 2.1, 2.2) is formed by a bar element (3; 3′; 3″; 3‴) which extends in a meander configuration in the peripheral direction of the stent (1; 1′; 1″; 1‴) and whose direction of curvature changes in the central region (16) between two turning points (3.1; 3.1″).

20. A stent as set forth in one of claims 15 through 19 characterized in that at least one annular support portion (2, 2.1, 2.2) is formed by a bar element (3; 3′; 3″; 3‴) which extends in a meander configuration in the peripheral direction of the stent (1; 1′; 1″; 1‴) and of which at least the center line is in the shape of a segment of an elliptical arc in the region of the turning points (3.1; 3.1″).

21. A stent as set forth in one of claims 15 through 19 20 in that at least one annular support portion (2, 2.1, 2.2) is formed by a bar element (3; 3′; 3″; 3‴) which extends in a meander configuration in the peripheral direction of the stent (1; 1′; 1″; 1‴) wherein each two bar element portions (17, 18) which are adjacent in the peripheral direction of the stent (1; 1′; 1″; 1‴) and which extend between the turning points (3.1; 3.1″) form the limbs of a V-shape.

22. A catheter for implanting a stent (1; 1′; 1″; 1‴) as set forth in one of claims 1 through 21 comprising a distal end, in the region of which there is provided a sheathing device (9; 9‴) for receiving the stent (1; 1′; 1″; 1‴) in its first condition, and a device for producing the relative movement between the sheathing device (9; 9‴) and the stent (1; 1′; 1″; 1‴) in the first direction (5; 5′; 5″; 5‴), characterized in that there are provided a device for producing the relative movement between the sheathing device (9; 9‴) and the stent (1; 1′; 1″; 1‴) in a second direction (14) in opposite relationship to the first direction (5; 5′; 5″; 5‴) and a holding device (10, 12) for holding the stent (1; 1′; 1″; 1‴) during said relative movement in the second direction (14).

23. A catheter as set forth in claim 22 characterized in that there are provided a sheathing tube (9; 9‴) whose distal end forms the sheathing device and a holding element (10, 12) arranged displaceably in said sheathing tube (9; 9‴) for producing the relative movement in the first and second directions (5, 14), for holding the stent during the relative movement in the second direction (14).

24. A catheter arrangement comprising a catheter (7; 7‴) as set forth in claim 21 or claim 22, in the sheathing device of which is arranged a stent (1; 1′; 1″; 1‴) as set forth in one of claims 1 through 20.

25. A method of positioning a stent (1; 1′; 1″; 1‴) as set forth in one of claims 1 through 21 in a vessel (8; 8‴), in which in a first step the stent (1; 1′; 1″; 1‴) is moved in a first condition to the expansion location, in a second step the stent (1; 1′; 1″; 1‴) is at least partially expanded, wherein there is provided a checking step in which the position of the stent (1; 1′; 1″; 1‴) is detected with respect to the expansion location, characterized in that in the second step the stent (1; 1′; 1″; 1‴) is only partially expanded and in at least one correction step it is put into a third condition in which it is in a sheathing device (9; 9‴) and its position with respect to the expansion location is modified.

26. A method as set forth in claim 25 characterized in that in the first step the stent (1; 1′; 1″; 1‴) is moved in a sheathing device (9; 9‴) to the expansion location, in the second step the stent (1; 1′; 1″; 1‴) is partially expanded by partial or after partial removal of the sheathing device (9; 9‴) from the stent (1; 1′; 1″; 1‴) and in the correction step the stent (1; 1′; 1″; 1‴) is put into a third condition in which it is in the sheathing device (9; 9‴) and its position with respect to the expansion location is modified.